

Outlook

Naval Medical Research and Development Command



Volume 3 Issue 2

On The Cutting Edge of Medical Research Today

August 1992

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COMMAND CHANGES

MAY 1992

CDR Robert W. Rendin, MSC, USN for **CAPT Douglas W. Call, MSC, USN** as Commanding Officer of the Naval Biodynamics Laboratory, New Orleans, LA. CDR Rendin was previously Executive Officer of the laboratory. CAPT Call is retiring.

JUNE 1992

CAPT Richard G. Hibbs, MC, USN for **CAPT Michael E. Kilpatrick, MC, USN** as Commanding Officer of US Naval Medical Research Unit No. 3, Cairo, Egypt. CAPT Hibbs was previously Executive Officer of the Unit. CAPT Kilpatrick has been assigned as Executive Officer of Naval Hospital, Orlando, FL.

OCTOBER 1992

CAPT Paul K. Weathersby, MSC, USN for **CAPT Robert G. Walter, DC, USN** as Commanding Officer of the Naval Submarine Medical Research Laboratory, Naval Submarine Base New London, Groton, CT. CAPT Weathersby was previously the Scientific Director of the laboratory. CAPT Walter has been assigned as Commanding Officer of the Naval Medical Research Institute, Bethesda, MD.

OCTOBER 1992

CAPT Robert G. Walter, DC, USN for **CAPT Larry W. Laughlin, MC, USN** as Commanding Officer of the Naval Medical Research Institute, Bethesda, MD. CAPT Walter was previously Commanding Officer of the Naval Submarine Medical Research Laboratory. CAPT Laughlin has been assigned to the faculty of the USUHS, Bethesda, MD.

COMPUTER-BASED PERFORMANCE TESTS TRANSITION FOR USE IN AVIATION TRAINING SELECTION

by CDR T.J. Singer, MSC, USN, RAM, Aviation Medicine and Human Performance

Computer-based performance tests (CBPTs) developed at the Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, FL, facilitate the assessment of cognitive and psychomotor skills of potential Naval and Marine Corps aviators. Research indicates that using the CBPTs as an additional screening test would enable the present rate of attrition from primary flight training to be reduced from 10% to 6%. Given the cost of training a single aviator can range from \$0.8 to \$1.5 million the reduced attrition represents a substantial savings to the Navy.

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ASBREM COMMITTEE

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REVISION OF THE ASBREM CHARTER

by CAPT R.L. Chaput, MSC, USN, Special Asst. for BUMED Liaison

In May 1992, the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee resolved to make significant internal organizational changes. One major change was the revision of the ASBREM Charter. (Other changes are being held for Congressional review. Results of this review should be available in 60 to 90 days.)

The revised charter strengthens the Committee by including as Co-Chairpersons, Dr. Enrique Mendez, Jr. the Assistant Secretary of Defense, Health Affairs (ASD(HA)) and Dr. J. Osterman, a representative of the Director of Defense, Research and Engineering (DDR&E). The ASBREM Steering Committee members are the flag rank service members of the original ASBREM Committee, Maj. Gen. Richard T. Travis, MC, USA, the Commander, U.S. Army Medical Research and Development

Command; Brig. Gen. George K. Anderson, USAF, MC, the Commander, Human Systems Division, Air Force Systems Command; and RADM Hugh P. Scott, MC, USN, the Deputy Commander for Fleet Readiness at the Navy's Bureau of Medicine and Surgery.

The five members of the ASBREM Secretariat are representatives of the Co-Chairpersons and the Steering Committee. CAPT John Jemionek, MSC, USN, the representative of the ASD(HA) will serve as the Chairperson of the ASBREM Secretariat. The other members of the Secretariat include CAPT Raymond Chaput, MSC, USN; COL Harry Dangerfield, MC, USA; COL George E. Schwender, USAF, MC; and the representative of the DDR&E (not designated as of 6/92). The Secretariat will oversee the activities of the seven Joint Technology Coordinating Groups (JTCGs) and keep the Committee

members apprised. The JTCGs are subordinate reviewing committees, each with one representative from the three services. The JTCGs and their areas of responsibility are Combat Casualty Care, Infectious Diseases, Human Systems Technology, Medical Biological Warfare Defense, Medical Chemical Defense, Ionizing Radiation, and Military Dentistry. Under the revised ASBREM charter the JTCGs (listed on page 2) will be empowered to recommend planning, programming, and budgeting for their respective programs to the ASBREM Committee.

CBPTs Transition

Also, the CBPTs can predict student success/attrition further along in training than any instrument currently available. Representatives from the Chief of Naval Operations; the Chief of Naval Education and Training; the Chief of Naval Aviation Training; and the Commander, Naval Recruiting Command reviewed the tests to determine the advisability of transition to the Naval Aviation Schools Command. The group carefully examined the background and development of the CBPTs and decided the tests will significantly enhance the ability to predict the likelihood that an aviation candidate will successfully complete primary flight training. The CBPTs may ultimately prove useful in establishing pipeline assignment guidelines and in identifying weak students with low probabilities of successful advanced flight training completion. By October 1992, twenty-five computer-based work stations will be installed and made available for field testing at the Naval Aviation Schools Command. A comprehensive economic analysis regarding the costs and benefits of long-term implementation of the CBPTs will be conducted. Many interested observers are eagerly awaiting the results of the CBPTs "fly-off".

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Safety Barriers in the Laboratory: Chemical Fume Hoods and Biological Safety Cabinets

by Kip Johnson, NMRDC Staff Assistant for Occupational Safety

Many laboratory injuries and infections can be traced to the exposure of a laboratory worker to hazardous chemicals or infectious agents. Chemical fume hoods and biological safety cabinets are hazard containment and protection barriers that safeguard the laboratory worker from exposure by drawing air away from the worker and through the hood or cabinet to be filtered and recirculated (Figure 1).

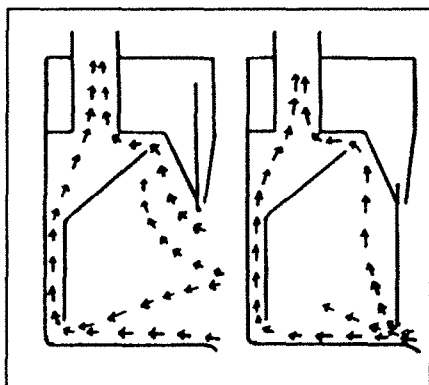


Figure 1
Conventional hood, sash open and closed

The Chemical Fume Hood

To reduce the toxic effects of chemicals with a chemical exposure Threshold Limit Value of 40 ppm or less a worker must perform procedures under a chemical fume hood. The purpose of the hood is to capture and retain microorganisms and to exhaust noxious or hazardous vapors, fumes and dusts from the work area. It is not intended to remove contaminants generated elsewhere in the laboratory. The volume of chemicals stored in a hood must be kept to a small working stock that does not block air vents or hinder airflow. The hood should be left on when these toxic chemicals are stored in it. Hoods also offer protection by containing small to moderate chemical explosions and fires.

The hood is vulnerable to air movement. The number and location of fans, air supply vents, windows, doors and the movement of personnel in the vicinity of the hood impact the hood's performance. A hood should be located in a remote portion of the lab selected for a low rate of air movement (Figure 2). Once installed, the hood should be checked for a proper air flow rate. A rate of 100-125 feet-per-minute with the sash open to a comfortable working height of 8-10 inches is ideal. Higher rates will cause air currents to form around the worker and draw vapors out of the hood and into the worker's breathing zone. The laboratory industrial hygienist should conduct annual safety checks on all chemical hoods currently in place and when hoods are installed, moved, or altered.

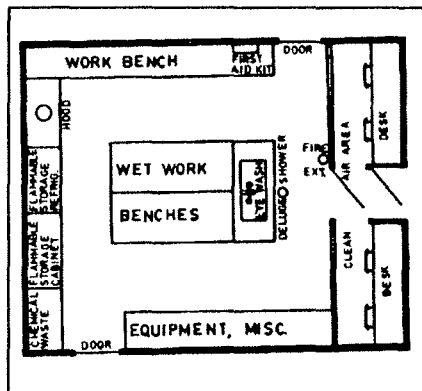


Figure 2
Standard laboratory module

The Biological Safety Cabinet

The biological safety cabinet is a modified hood intended to protect the worker from particulates and aerosols generated from microbiological manipulations within the cabinet. High Efficiency Particulate Air (HEPA) filters are placed in the exhaust ducts to remove particulates from the air being exhausted. HEPA filters are 99.97% effective in removing par-

ticles .03 μ m or greater in size. The filters, however, are ineffective in the removal of gaseous chemicals and must never be used to protect against these agents.

The sashes of the cabinet are usually fixed at a level of 8-10 inches above the workbench. Sashes can be unbolted and swung up to allow for the placement or removal of equipment.

There are three types of biological safety cabinets. A class I cabinet pulls air into the cabinet and passes it through a HEPA filter before the air is discharged or recirculated. A class II cabinet (Figure 3) recirculates a portion of the exhausted air through a HEPA filter, back over the working field and then the air is recaptured. This "clean air" helps prevent contamination of the biological environment. A class III cabinet is totally enclosed and is used when working with class 4 highly infectious microorganisms.

Hoods and cabinets are fragile pieces of machinery and must be checked for safety at the time of installation, whenever moved, during annual industrial hygiene inspections and following a large chemical spill or other emergency.

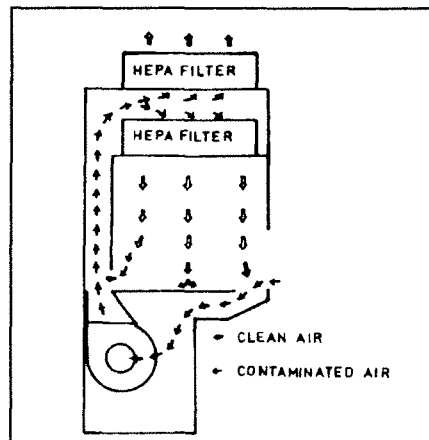


Figure 3
Class II biosafety cabinet

CONGRESSIONAL INVOLVEMENT IN DOD USE OF ANIMALS

by LTC G.B. Heisey, VC, USA, NMRDC Special Assistant for Veterinary Medicine

On April 7, 1992, the House Armed Services Committee, Research and Development Subcommittee held hearings on the use of animals in military medical research. Two panels presented testimony to a subcommittee of one, Congressman Ronald V. Dellums (D-CA), Chairman.

Panel 1 members discussed DOD animal use policy and argued that DOD began its regulatory oversight of animal care and use concerns in the early 1960's, prior to passage of the Animal Welfare Act (AWA) in 1966 and today DOD complies with present laws and regulations. The panel also stated that while DOD is interested in and is currently using alternatives to animals, animals remain necessary for medical research. The number of laboratory animals used per year by DOD was presented during the hearings and it was noted that usage is down by 35% from earlier years. Panel members added that DOD is working toward 100% accreditation by the American Association for Accreditation of Laboratory Animal Care (AAALAC).

Panel 1 included the representatives of DOD: Dr. Joseph V. Osterman, Director, Environmental and Life Sciences, Office of the Secretary of Defense; Dr. Robert R. Jorgensen, USUHS; COL William C. Cole, Letterman Army Institute of Research (LAIR); and, COL John G. Golden, Brooks Air Force Base, Texas.

Panel 2 members, except for the representatives of the National Association for Biomedical Research (NABR) and American Medical Association (AMA), were highly critical of DOD. The NABR and AMA representatives noted that military research has brought benefits not only to the Armed Forces but also to the general public as well, such as antimalarial drugs, improved techniques for treating bacterial diarrheas, and improved surgical and therapeutic regimens for dealing with ballistic wounds. They warned that the real goal of animal rightists is the abolition of all animal use, although animal rightists have failed to win general public support

for this issue. The NABR and AMA representatives also pointed out that less than ten percent of the Physicians Committee for Responsible Medicine (PCRM) membership is comprised of physicians.

DOD was portrayed by animal rights advocates as cruel, with little interest in animal pain. They further alleged that DOD research is secret, reporting only to the Secretary of Defense, with inadequate or no oversight from other Federal agencies or the Congress.

Some of the recommendations put forth by panel 2 were: (1) a ban on DOD research; (2) NIH or universities performing DOD research; (3) a moratorium on expansion of DOD research prior to an investigation; (4) a ban on new DOD animal research facilities and on improvements in existing facilities; (5) transfer of DOD money to public health care treatment facilities with progress reports to DOD on gunshot wounds and traffic accidents; (6) more outside review of DOD experiments by ombudsmen and animal advocates; and, (7) a ban on animal experiments involving certain levels of pain.

Panel 2 members were: Dr. Elliot Katz, In Defense of Animals (IDA); Dr. Neal D. Bernard, Physicians Committee for Responsible Medicine (PCRM); Dr. Martin L. Stephens, Humane Society of the United States (HSUS); Mr. Donald J. Barnes, National Anti-Vivisection Society (NAVS); Mr. John A. Bachman, International Foundation for Ethical Research; Ms. Jan Polon Novic, (former) public member of the LAIR Animal Care and Use Committee (ACUC); Ms. Frankie Trull, National Association for Biomedical Research (NABR); and Dr. Daniel H. Johnson, Jr., American Medical Association (AMA).

As a result of this hearing, the subcommittee proposed several additions dealing with animal research to the Department of Defense Authorization Act. These additions include requiring the Secretary of Defense:

- (1) to explain why all DOD laboratories are not AAALAC accredited and to submit a comprehensive annual report to Congress on animal cost and use including extramural programs
- (2) to appoint an ombudsman for animal issues to field and act on any complaints
- (3) to appoint animal advocates as the community members to the ACUC
- (4) to require the DOD IG to conduct a review of every program to determine whether laboratories are adhering to the AWA
- (5) to request the GAO to conduct a review of every animal program funded by DOD with the intent of identifying areas where programs overlap

Representatives of DOD are expected to express their disagreement with the recommendations of the Committee based on a DOD record of strong compliance with the AWA, the unnecessary expense involved with obtaining the cost data, and the inappropriateness of involving the GAO in reviewing DOD research. Even if this language remains in the Bill, it must still be approved by the full House, Senate, and then Conference Committee.

NAVAL HEALTH RESEARCH CENTER PROVIDES KEY EPIDEMIOLOGIC DATA TO NAVY DECISION MAKERS

by Frank Garland, Ph.D. Head, Division of Epidemiology, Department of Health Sciences and Epidemiology, NHRC

The major objective of the epidemiology program at the Naval Health Research Center (NHRC), San Diego, CA, is the development of data that can be easily accessed for research in the areas of classical, clinical, and behavioral epidemiology; health promotion; and medical effectiveness.

The program brings together the capabilities of military and civilian epidemiologists to address major research issues facing Navy medicine. Seven data bases currently available for researchers are: (1) Service History File, (2) Medical History File, (3) Training Injury File, (4) Navy Ship Deployment File, (5) Navy HIV Central Registry, (6) Restricted Outpatient File, and (7) special survey files. The chart on page 7 provides details on the data bases.

The Epidemiology Division has collaborated in several studies in response to questions of Navy medical importance. One example is a study completed this year on the distribution of T-4 cell counts on initial evaluation of HIV seropositive personnel that involved the research staffs from NHRC; the Naval Hospital, San Diego; the Naval Medical Research Institute, Bethesda, MD; and the University of Arkansas. Another study, focusing on the geographic distribution of HIV in Navy personnel within the United States, was carried out by investigators from NHRC; the University of California, San Diego; and the Uniformed Services University of the Health Sciences, Bethesda, MD.

These studies emphasize the interaction between medical and epidemiologic experts inside and outside of the Navy. The emerging role of the Assistant Secretary of Defense (Health Affairs), will place additional emphasis on the importance of basic etiologic research, health promotion research, modeling, and health policy decision support.

The value of such data bases for Navy policy-makers is apparent for the establishment of baseline and time-trend information for program evaluation such as attainment of Year 2000 National Health Objectives. The Objectives were set by the U.S. Department of Health and Human Services and have the goal of reducing death, disease, and injury in the U.S. The Objectives are

divided into four areas: health promotion, health protection, preventive services, and system improvement. A comprehensive approach using integrated data sources will be required to measure the attainment of the Objectives.

The Epidemiology Division is located within the Department of Health Sciences and Epidemiology (Head, Dr. D.S. Nice), and has a newly-formed Clinical Epidemiology Section (Director, CAPT S.K. Brodine, USN).

For more information contact Dr. Frank Garland, NHRC, Department of Health Sciences and Epidemiology, Division of Epidemiology (Code 242), San Diego, CA 92186-5122/ 619-553-6881.

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Naval Hospital Oakland
Naval Hospital Okinawa
Naval Medical Research and Development Command
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NHRC DATA FILES

Service History File

Detailed demographic and career information for all Navy and Marine Corps personnel serving on active duty since 1965.

Medical History File

Complete hospitalization records, Physical Evaluation Board findings, Medical Board findings, and deaths among hospitalized active-duty Navy and Marine Corps personnel since 1965.

Restricted Outpatient File

Outpatient information is limited. Currently Operation Desert Shield/Storm outpatient data are available and were provided by CDR Kevin Hansen. Mr. William Pugh has collected some sick call visits aboard ship. As the Automated Medical System comes on-line more outpatient data will be available.

Training Injury File

Training injury data are collected from 10 remote training facilities and linked to the NHRC VAX (expected to be fully operational in 1993)

1. Naval Training Center, San Diego
2. Naval Training Center, Orlando
3. Naval Training Center, Great Lakes
4. U.S. Naval Academy Annapolis
5. Naval Special Warfare Center, Coronado
6. Marine Corps Recruit Depot, Parris Island
7. Marine Corps Recruit Depot, San Diego
8. USMC Combat Training Center, Camp Pendleton
9. USMC Officer Candidate School, Quantico
10. USMC Basic School, Quantico

Special Survey Files

Surveys of lifestyles, attitudes, and other factors are collected as needed for NHRC and other Navy investigators (e.g. job satisfaction of reservists, survey conducted by Dr. Steven Nice).

Navy HIV Central Registry

HIV Seropositivity Registry: 4,500 entries for all confirmed HIV seropositive individuals. Updated daily.

The Reportable Disease Database File: Four million test results of all ELISA and Western Blot Assays designated as positive or negative only.

The Western Blot Serology File: 35,000 detailed Western Blot positive and negative results.

The HIV Clinical Evaluation File: Laboratory and physical exam results for 9,000 clinical evaluation for 3,400 HIV seropositive individuals.

Navy Ship Deployment File

Ship deployment data since 1980 provided by the Office of the Chief of Naval Operations.

METRIC AND PATENT APPLICATIONS UPDATE

A recent article in the *Official Gazette* from the Patent and Trademark Office, pointed to the 1988 trade bill where Congress established metric as the nation's "preferred system of units for U.S. trade and commerce". Congress set a 1992 date for Federal agencies to complete their transition to metric use.

Currently, the Patent and Trademark Office does not require weights and measures in patent applications to be stated in the metric system. In Section 608.1 of the Manual of Patent Examining Procedures, all patent applicants are strongly encouraged to use either (1) only metric units or (2) inch-pound units together with the metric equivalents, when describing inventions in the specification of patent applications.

NMRDC QUARTERLY LISTING

The NMRDC Quarterly Listing of Reports, Abstracts and Articles is published in March, June, September and December of each year. The purpose of the listing is to inform the Bureau of Medicine and Surgery, the Office of Naval Research, the Office of Naval Technology, the Office of Advanced Technology, and other Government agencies and interested parties

concerning the science supported by this Command. The listing includes information concerning aviation medicine and human performance, occupational health, combat casualty care, infectious disease, and submarine and diving medicine. To receive a copy of the the listing fill out the coupon below and mail to Code 04A1, NMRDC, NNMC, Bethesda, MD 20889-5044.

NMRDC Quarterly Listing of Reports, Abstracts & Articles September 1992

Name _____

Organization _____

Address _____

City _____ State _____ Zip _____

Notes from the Intellectual Property Counsel

NMRDC INTELLECTUAL PROPERTY HANDBOOK WILL SOON BE AVAILABLE

A. David Spevack, NMRDC Intellectual Property Counsel

The NMRDC Intellectual Property Handbook contains a series of instructions and sample forms relating to Intellectual Property and Cooperative Research and Development Agreements (CRDAs). Copies will be provided to laboratory Commanding Officers, Scientific Directors and researchers. The handbook covers the following areas:

Invention Rights of Non-Federal Government Employees

The rights of an IPA (Intergovernmental Personnel Act) employee, research fellow, or visiting scientist in any inventions made while working for the Federal Government are controlled by the terms of the agreement between the individual, the sponsoring organization and the hiring command. In almost all cases, employment contracts with a non-Federal Government employee are silent with respect to patent rights. That means the contract does not discuss what is done regarding rights in any inventions. The handbook addresses how to resolve this problem.

Reporting the Processing of Inventions Created by NMRDC Researchers

The Secretary of the Navy has specific policy and responsibilities controlling the reporting of inventions made by or on behalf of the Department of the Navy. The handbook explains how NMRDC researchers should submit an invention disclosure.

Biological Materials Transfer Agreement

Biological materials such as cell lines, hybridomas, bacteria, viruses or yeasts, created using Federal Government time, money and materials are the property of the Federal Government. Such biological

materials have potentially high commercial value and, particularly with new materials, may have the potential for liability caused by contamination or unexpected or unknown properties. Biological materials may be transferred from one organization to another under agreements and procedures set out in this instruction which protect the liability and property interests of the originators. Biological materials originated by the Government can be transmitted to a non-Federal party for commercial purposes under a CRDA.

Research Documentation Requirements (Lab Notebooks)

The importance of scientific and technical data makes it necessary to officially document such information in permanent form by the use of laboratory notebooks. This information is used to inform others, to evaluate accomplishments, to ensure recognition for successful investigators, and to keep accurate

accounting of what is done experimentally. When computerized records are used, it is still important to have paper records to prove what research was done. The notebooks establish evidence that work was done, when it was done, and the results that were obtained in order to defend the Federal Government's and the employee's rights in patent litigation or other actions. This instruction sets Command requirements for keeping notebook records.

Invention Evaluation

There is a need to develop a system to determine the potential value of NMRDC employee's or contractor's inventions reported under Navy contracts administered by NMRDC or the subordinate commands. This instruction ensures efficient use of Navy patent resources and identifies inventions for protection of the technology under U.S. and foreign patent statutes.

PITFALLS IN WORKING UNDER A CRDA

The negotiations of a Cooperative Research and Development Agreement (CDRA) involve several months of discussions with a company focusing on the ownership rights of patents that may result from the collaboration. The collaboration can result in a great breakthrough that will require an invention disclosure by the principal investigator under the CDRA. A hidden pitfall is that the invention disclosure identifying the inventors can show a name of someone not mentioned as part of the research team in the CDRA and who is not a Federal Government employee. An IPA (Intergovernmental Personnel Act) employee, research fellow, or visiting scientist is not a Federal Government employee.

When NMRDC negotiates a CRDA, we guarantee the collaborator that the Government will take title to the inventions made by Federal Government employees, and give the collaborator license (most likely exclusive) in the results of this research. Unless we have a prior agreement with the non-Federal Government employee to assign patent rights to the Federal Government, that individual owns an undivided share in any invention listing that individual as co-inventor.

CRDAs are an important part of this Command and bring in research dollars and materials. Counsel must be informed of all conditions existing in a research situation.

CDR JERRY MICHAEL LINENGER, ASTRONAUT CANDIDATE

CDR Jerry M. Linenger, a medical researcher at the Naval Health Research Center, San Diego, CA and a flight surgeon with more than 500 military flight hours in the cockpit, will join the team of Navy space pioneers and become part of America's history. CDR Linenger is one of 19 people selected from a field of more than 2,000 qualified applicants for the NASA Space Shuttle program.

This month CDR Linenger is scheduled to enter the rigorous astronaut training program at the Johnson Space Center in Houston, TX. After training he will receive a technical assignment leading to selection as a crew member for one of the shuttle flights where he anticipates conducting experiments in weightless physiology.

CDR Linenger hopes to be researching new methods to enhance human endurance in a zero-gravity environment. He believes his research in this area will be applied in the design, construction



CDR Jerry M. Linenger a medical researcher at the Naval Health Research Center, San Diego, CA, was selected as an astronaut candidate for NASA's Space Shuttle program.

and living conditions aboard Space Station Freedom, due to be fully deployed in orbit in 1999. In fact, CDR Linenger hopes to be aboard Freedom.

CDR Linenger has authored numerous medical studies and has been the principal investigator for

numerous physiology projects custom designed for the research he will conduct for NASA. In one investigation, working in conjunction with Johns Hopkins researchers, CDR Linenger piloted a study to examine the bone remodeling process during physical activity.

DR. THOMAS G. DOBIE RECEIVES AWARD

Dr. Thomas G. Doble, OBE, was presented the 1992 Arnold D. Tuttle Award at the annual meeting of the Aerospace Medical Association. The award, sponsored by the Atlantic Richfield Company, recognizes "original research toward the solution of a problem in aerospace medicine that is published in *Aviation, Space and Environmental Medicine*." Working in motion sickness research at NBDL for eight years, Dr. Dobie developed the Cognitive-Behavioral Anti-Motion Sickness Training Program currently being prepared for fleet use. Dr. Dobie completed his work at the laboratory in June 1992, and will return to Leeds University in the United Kingdom.

CALLING ALL PHOTOGRAPHERS

The NMRDC public affairs office is planning future publications that will highlight the research and development programs at NMRDC laboratories. Photographs from our photographers in the labs and in the field are needed to compliment these publications. Photos are needed that highlight the unique research facilities of individual labs and the research program areas: submarine and diving medicine, infectious disease, fleet occupational health, aviation medicine and human performance, combat casualty care and dental research. The subject of the photos can be seen through the microscope, at the bench, in the field or

on the sea. All photos submitted may be either black or white prints, color prints, or color transparencies. The minimum size print is 5"x7". Transparencies must be in 35mm format. Each photo must include a caption explaining the subject matter and identifying the people and location. The photographer's name, address and telephone number should also be included. Extra copies of the publications will be available to photographers.

For more information contact D. Ryan, Code 09D, NMRDC, NNMC, Bethesda, MD. 20889-5606 or call 301-295-0875.

HM2(DV) DARYL F. STANGA SELECTED NMRDC 1992 SAILOR OF THE YEAR

HM2(DV) Daryl F. Stanga is one of the Navy's finest Petty Officers. He is the Saturation Dive Watch Supervisor in the Diving Biomedical Technology Department and the Leading Petty Officer of the Health Monitoring Division at the Naval Medical Research Institute (NMRI), Bethesda, Maryland.

HM2(DV) Stanga has a pivotal role in providing medical support for Navy divers engaged in multiple experiments including studies in decompression sickness, thermal protection and breathing support, and work tolerance in the hyperbaric environment.

HM2(DV) Stanga transferred to NMRI in November 1989. He quickly mastered all his medical responsibilities and started qualifying on watch stations on the Command's Man-Rated Chamber Complex. By September, 1991, he qualified on all seven watch stations, including Dive Watch Supervisor. HM2(DV) Stanga became the first Second Class Hospital Corpsman in the history of Navy diving to qualify as a Dive Watch Supervisor on a saturation diving complex.

Because of his superior performance, he was nominated and selected as NMRI Sailor of the Quarter for the Third Quarter 1991 and subsequently selected as NMRI Sailor of the Year for 1991.



HM2(DV) Daryl F. Stanga
NMRDC 1992 Sailor of the Year

TWO NBDL STAFF MEMBERS HONORED WITH AWARDS

Gilbert C. Willems received the Department of the Navy Meritorious Civilian Service Award

NBDL's commanding officer CAPT Douglas W. Call, recognized Mr. Willems with the highest honorary award the head of an activity may confer on a civilian employee. Since the laboratory was established 21 years ago, Mr. Willems has been instrumental in helping the Command gain an international reputation for success in measuring the biomedical effects of mechanical forces encountered by Naval personnel operating modern weapons systems.

Mr. Willems developed an original design for an accelerometer selection system which permits the use of the minimum number of accelerometers to define three-dimensional motion in space for the maximum time duration. This instrumentation scheme has proven itself accurate and viable for two decades, measuring human head and neck responses to acceleration.

Among many significant accomplishments, Mr. Willems designed data acquisition and accelerometer calibration systems, developed control room specifications and designed signal and power distribution systems for the laboratory's impact acceleration testing devices. In addition, he designed and built control systems for the

Navy's ship motion simulation device, also operated at the laboratory.

HM2 Gail Seaman, USN, received the New Orleans Area Federal Women's Appreciation Award (Military Enlisted Category) from the New Orleans Federal Executive Board

HM2 Gail Seaman was cited for her exceptional performance and devotion to service through competence, efficiency, leadership, inspiring teamwork, voluntary service to civic activities, and for advancing equal opportunity.

As coordinator of NBDL's Combined Federal Campaign, HM2 Seaman helped exceed a command goal record. She also coordinated a highly successful Partnership-in-Education program between the laboratory and the Henry C. Schaumburg Elementary School in East New Orleans. A certified CPR instructor, HM2 Seaman spends many off duty hours training military and civil service personnel in basic first aid and life support procedures. She has passed the National Emergency Medical Technician Certification Exam and has been selected Sailor of the Quarter for the second consecutive quarter.

POSTDOCTORAL FELLOWSHIP PROGRAMS AT NMRDC LABS

by Christine Eisemann, Associate Director for Research Management

NMRDC participates in two postdoctoral research programs:

1. National Research Council's (NRC) Resident Research Associateship (RRA) Program
2. Office of Naval Technology's (ONT) Postdoctoral Fellowship Program

Each of these postdoctoral fellowship programs has its unique opportunities and constraints, making it more or less suitable to the laboratory and the prospective associate. Both postdoctoral programs require the applicant to hold a Ph.D., Sc.D., or recognized equivalent and to be approved by a professional review panel. Both programs provide one-year appointments (renewable to two years), a group insurance plan (e.g., medical, dental, life, and disability) and allowances for relocation and professional travel.

Some aspects that differ between the two programs are stipends, costs, and due-dates. A significant constraint of the ONT program, but not the NRC program, is a requirement for U.S. citizenship and security clearance eligibility (therefore, foreign scientists do not qualify). A brief comparison of these two programs is shown in the chart above.

Recently, there was a notable change in NMRDC's operating procedures in the NRC program. In June 1992, management of the NRC program was transferred from NMRDC to the Naval Medical Research Institute (NMRI). This was done because NMRI has been the most active participant in the NRC program in recent years and keeping NMRDC as *middleperson* added little value to the management process. The present NRC/NMRI contract was designed to accommodate all of the NMRDC laboratories that participate in the program and provides some flexibility that should make par-

Comparison of Postdoctoral Fellowship Programs at NMRDC Laboratories

Element	ONT/ASEE	NRC/RRA
Stipend (year 1)	\$36.0K	\$33.0K
Stipend increase (year 2)	\$ 1.0K	\$ 1.0K
U.S. citizenship	required	not required (must speak English)
"Secret" clearance eligibility	required	not required

ticipating in this program simpler than in the past.

The main adjustment in the new NRC/NMRI contract is the timing of the laboratories' payments for postdoctoral associates. In the former contract, all costs and administrative fees for existing and anticipated associates were prepaid by the laboratory at one time during the year (Oct-Nov time-frame). Expected associates, however, did not always materialize and sometimes monies invested by specific research groups were "lost" into the general NMRDC account at the NRC. Although the new contract still allows such prepaying for associates, it also allows the laboratories to transfer funds immediately after the associate has been accepted by the NRC.

This procedure reduces the possibility of a laboratory's providing funds to the contract but not securing an associate. It is the same payment method used by the ONT program (the ONT program also allows incremental payment during the fiscal year). All payments for NRC associates will go through NMRI. Details of the entire process for an NRC associate can be obtained from LCDR Dennis Kelleher, NMRI, (301) 295-0220/0007. Pay-

ments for ONT associates go directly from the laboratory to ONT, through a Request for Contractual Procurement.

In the past, the ONT program has provided NMRDC with one free postdoctoral associate each fiscal year. Although ONT plans to maintain this benefit to the medical research community, much depends on Congressional budget actions. If the free associateship benefit is maintained, ONT requires NMRDC to identify which of the applying NMRDC laboratories will receive the free associate.

The NRC program is available at NDRI, NMRI, NSMRL, NHRC, NAMRL and NAMRU-3.

The ONT program is available at NDRI, NMRI, NMRI-Toxicology Detachment, NBDL, NSMRL, NHRC, and NAMRL.

For more information contact Christine Eisemann at 301-295-0882

HIGHLIGHTS OF NMRDC RESEARCH

NAMRL RESEARCHERS PRODUCE A MINIATURE EAR-CANAL RADAR DETECTOR

Physical constraints and mission scenarios do not allow conventional electronic warfare (EW) countermeasures equipment to be placed aboard the special boats used by Navy Special Warfare (NSW) personnel. Boat crews, however, have an urgent need to know if they are being scanned by hostile radar. Any practical solution would have to be rugged, lightweight, and not interfere with crew tasks. Researchers in the Bioengineering Division, Naval Aerospace Medical Research Laboratory, Pensacola, FL, may have found an answer to this problem in the electronic modification of a miniaturized hearing aid. With the microphone removed and a sensitive detector circuit installed, one prototype device showed sensitivity to a wide spectrum of modulated radiofrequency (RF) energy, from 2.0 MHz to 22 GHz, and could detect a weather radar at a distance of seven nautical miles. A refined version of this device could enhance the operational capability of NSW forces; furthermore, a smaller, less sensitive version has potential application in the private sector as an early-warning device for workers who might be occupationally exposed to RF energy.

EFFECT OF MISSION TASKING ON WORK/REST SCHEDULES AND SUBJECTIVE READINESS OF NAVAL AVIATORS

Among the major concerns in naval aviation are the effects of sustained flight operations on aircrew readiness and performance. Around-the-clock flight operations can lead to fatigue, stress, reduced sleep, poor sleep quality, performance degradation, and even circadian desynchrony (a disruption in the normal daily variations in a variety of physiological functions and behaviors). Researchers in the Aviation Performance Division of the Naval Aerospace Medical Research Laboratory, Pensacola, FL, participated in deployments on the USS AMERICA (CV-66) to the Red Sea during Operations Desert Shield/Storm and more recently on the USS SARATOGA (CV-60) during a fleet exercise. They collected data from a wide variety of aviators on work/rest schedules, subjective readiness to conduct an air strike, landing signal officer grades, and mission tasking. The USS SARATOGA (CV-60) study included the collection of cognitive performance data pre- and post-flight from S-3 Viking and F/A-18 Hornet aviators. This information will enable an examination of the effects of mission tasking on work/rest cycles, performance, and subjective readiness. This unique study should prove of considerable value to airwing commanders, squadron skippers, flight surgeons, and others committed to preserving and maximizing aircrew performance.

NDRI-DET BETHESDA DEVELOPING NON-INVASIVE METHODS OF SCREENING FOR DENTAL DISEASE

Identifying personnel at risk of developing debilitating dental disease is a major goal of dental research in the Navy. Current studies are focusing on developing and testing non-invasive methods of screening for the most costly diseases that dentists treat — caries, cracked tooth syndrome, and periodontal disease. Several physical and biological approaches are being pursued by investigators at the Naval Dental Research Institute Detachment at the Naval Dental School, Bethesda, MD. Future dental evaluation techniques will use ultrasonic imaging intradentally for cracks and caries and periodontally for non-invasive measurement of disease progression. In addition, new dental approaches being studied include the evaluation of caries screening tests; the evaluation of periodontal disease indicators using gingival crevicular fluid; and identifying the mediators of chronic inflammatory disease related to polyclonal B-cell activators, T-cell superantigens, and periodontopathogens. Reducing the overall treatment needs through maximizing the dental health of military personnel is a clear objective for aiding operational readiness.

NMRI AND NSMRL DESIGN A COMPUTER MODEL TO PREDICT THE ONSET OF DECOMPRESSION SICKNESS

Diving medical scientists at the Naval Medical Research Institute, Bethesda, MD and the Naval Submarine Medical Research Laboratory, Groton, CT developed and tested a computer model that accurately predicts the incidence and time of onset of decompression sickness (bends) for human divers. The model runs in real time on a 386 PC. It can be used to calculate decompression sickness for any nitrogen-oxygen breathing gas mixture. The model generates decompression schedules for single dives to a single depth, repetitive dives to a single depth, single multi-level dives, and repetitive multi-level dives. It also supports decompression procedures that employ high oxygen concentrations and surface decompression. Only minimal refinement is expected to be required over the next several months before this model is used to produce the next generation of decompression schedules and procedures for the US Navy Diving Manual. Further development is planned to modify the model for use in divers' wrist-born underwater decompression meters.

SUBMISSION TO HIGHLIGHTS

Investigators who would like to submit research summaries to HIGHLIGHTS can write for guidelines and publication deadlines: NMRDC, Code 09D, NNMC, Bethesda, MD 20889-5606 or call 301-295-0875 or DSN 295-0875.